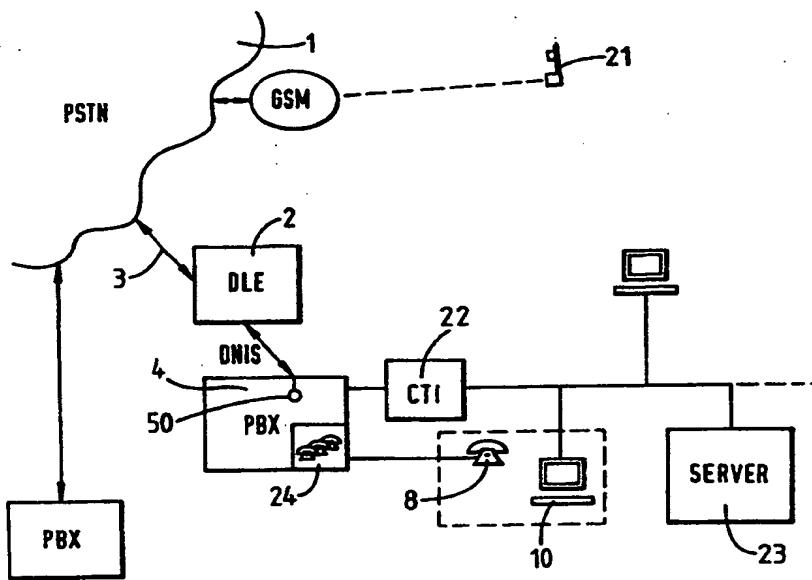




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(54) Title: COMPUTER TELEPHONY INTEGRATED NETWORK



(57) Abstract

The invention concerns an integrated computer and telephony system and a method of integrated computer telephony in which at least one main switch is capable of receiving incoming telephone calls and of dialling outgoing calls. A computer terminal is associated with the switch and means are provided for recognising that a telephone number connected to the switch as an incoming call is associated with said computer terminal; together with and means for causing said computer terminal to give an indication that an incoming call has been received, with the call being held by the switch so that the computer terminal indication is without the telephone being caused to ring.

Computer Telephony Integrated Network

The present invention concerns systems which utilise
5 the combined capabilities of computers and telephony.

Historically computers and telephony have occupied
different areas in the overall field of technology with
the exception of the increasing use of computer
10 technology in controlling and managing telephone
networks. However there is now a rapid convergence in
these two areas so that the boundaries between computing
and telephony are becoming harder to define. Thus
computers, as well as being used to control telephones,
15 can have special telephone interfaces that carry out the
telephony functions; additionally information carried
over telephone lines can be detected by computers and
used to handle the calls more efficiently.

20 One of the forces driving the integration of
computing and telephony is that modern businesses have
a growing need to unite individuals in different
locations into project teams. Another concept uniting
computing and telephony is that of the "hot desk" where
25 an individual does not necessarily have a single defined
office location but may rather be migratory so that
his/her office is defined at the point of logging-in to

British Telecommunications Limited and is known as Distributed Office Technology (DOT). In a DOT network each telephone user has an associated terminal by means of which he/she can log into what can be referred to as a virtual work group. Once logged-on the user will be provided on the associated monitor with a visual indication of each member of the team. Both the telephony and physical status of each member of the virtual work group is thus displayed on the monitor, which can be the screen of a standard PC which acts as the terminal. Users may add and remove members from the work group at any time. This can be achieved by dragging and dropping a new individual from a directory onto the work group. When a user receives a phone call, not only does the telephone ring at the physical location but the user's icon will flash and a screen pop will appear. Every other member of the virtual work group who has logged in will be able to see that the particular member of the team has a call ringing. The user can analyse the screen pop, and answer or reject the call. The screen pop will at the very least give the number of the incoming call and, if available, the network database additional relevant information concerning the caller. However the fact that a system as just described has come into existence has been largely caused by the mobility of the members of the work group. An obvious result of such mobility is that an intended recipient of a call can

answered. This position is local networks if an intended recipient has a phone number outside the local network.

5 The present invention is concerned with providing a simple solution to these various problems.

US Patent Specification No US-A-4653090 discloses a method of setting up, manipulating and taking down communication connections utilising graphics screens at 10 computer terminals. It is basically concerned with conference calls and does not answer the problem concerning the delivery of calls to a phone as already set out.

15 GB Patent Specification No GB-A-2294178 discloses a telephone call alerting system in which telephones are always rung.

20 In one aspect the present invention is concerned with solving this problem.

25 In accordance with a first aspect of the present invention there is provided a communication system comprising an integrated computer and telephony system comprising:

at least one main switch capable of receiving incoming telephone calls and of dialling outgoing calls;

readily understood, an embodiment thereof will now be described by way of example and with reference to the accompanying drawings in which:

5 Figure 1 is a diagram showing the general telephony environment in which the present invention operates;

10 Figure 2 is a more detailed diagram showing a part of a CTI network which incorporates the present invention; and

Figure 3 is a diagram showing the flow of data between a CTI switch and a computer.

15 Referring now to Figure 1 of the accompanying drawings, 1 indicates the Public Switched Telephone Network (PSTN) and 2 a Digital Local Exchange (DLE) connected to the PSTN by appropriate links 3. Four PBX's 4 are shown, connected again by appropriate links to the 20 DLE 2. Naturally the complete system will have many more DLE's and PBX's.

25 Figure 1 also shows individual telephones 5, 6 connected to the PSTN as well as telephones 7 and 8 which are associated with computer terminals 9, 10 which are in turn connected to a conventional network server which has not been shown. As shown by the dotted line 11, it

network. This network can be of any standard kind.

Referring now to Figure 2 of the accompanying drawings, integers in this figure which are common to Figure 1 have been given the same reference numerals. Figure 2 additionally shows a GSM 20 linked to the PSTN 1 and to a mobile phone 21, the mobile phone having an associated lap-top computer 21'.

In this figure it is assumed that the telephones 7 and 8 are linked into a CTI network with the enabling link shown at 22, and a UNIX server is indicated at 23. A bus 101 interconnects the computer and the server 23 to provide a computer network. The system shown in Figure 2 enables an incoming call from the PSTN to cause a display on the monitor of a terminal associated with the incoming call without the necessity of the telephone itself ringing. Thus the incoming call is in effect held whilst the presence of the incoming call is indicated at the computer terminal. An additional feature is that when the receipt of an incoming call has been displayed in this manner, the computer network can also inform other members of the network of the fact that a call has been received.

25

In Figure 2 it will be seen that each office-based computer terminal besides having an associated monitor

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In Figure 3 the CTI-enabled PBX of Figure 2 has been replaced by a general switch indicated at 25. This is because the functions to be described can be carried out by different types of hardware. Thus switch 25 could be 5 an Interactive Voice Unit (IVU) or a PBX/ACD, that is an automatic call distributor. In fact, the actual configuration of switch 25 is not an essential factor in carrying out the present invention. This will be expanded upon hereinafter.

10

The interaction between the switch 25 and the computer is as follows:

at 100 the switch 25 responds to an incoming call 15 DNIS (Figure 2) from the PSTN and generates a route request for the received call. This call is labelled CID1. CID means Call ID and is a unique handle for that call, with the number indicating that it is the first call in this particular sequence.

20

In response to the route request (CID1) the computer 10 at 101 returns to the switch a Route Select Signal which effectively ensures that the calling party receives a ringing tone. At 102 the computer refers to its 25 database 200, stored for example in the server hard discs, and asks to be given a list of numbers. This list corresponds to locations of computer terminals for the

indicated at 106 in Figure 3. the data sent at 106 to the switch will be a route select signal such that the presence of the incoming call held at the switch will cause the selected telephone number to ring. Of course 5 the computer terminal will already have alerted the user of that phone that a call will be coming. If one of the users of the other alerted terminals decides to intercept the call this can be done in a variety of manners. Thus a user can use a simple manual input via a key or a 10 pointer device such as a mouse to indicate his/her interest in the call. Alternatively, the terminal could include voice recognition and respond to a voiced command. In this context it is possible for the computer, as well as generating a ringing tone, and 15 perhaps a screen pop, to use voice synthesis to announce the arrival of the incoming call, for whom the call was initially intended, and the identity of the calling party. It is possible that no member of the virtual work group is present or wishes to intercept the call to which 20 they have been alerted via their computer terminals. In such a case the system may include the possibility of diverting the incoming call to a voice mail facility.

In the system just described the flexibility allowed by the presence of the computer terminal can be utilised to provide further advantageous features. Thus the computer can be configured so as to respond in a variety

has been used in the specification this term does not imply a single fixed group. Basically for any one user the group encompasses those numbers in which the user is interested. Thus the make up of a group can vary from 5 user to user either under the user's own choice or as decided by some other person.

To give a simple example if there are four telephone numbers in the stored list the system can generate a 10 different ringing tone for each number with each terminal using the same set of four ringing tones. Thus when the terminal of the intended recipient of an incoming call is logged in and is alerted he/she will hear the ringing tone associated with that terminal and the other 15 terminals within the group, which will also have been alerted, will give the same ringing tone and thus indicate to their users that somebody is trying to access a member of the group though not that specific terminal.

20 It is of course possible for each computer terminal to be individually configured so as to give confirmed alert indications which although specific to that terminal nevertheless differentiate between the various members of the group.

Another feature is that whilst a member of the group has not logged his/her terminal into the system, the

exchange or any switch operated by a third party operator or a telephony company.

indication identifying the intended recipient of the incoming call.

3. A system as claimed in any one of the preceding 5 claims bearing at least one computer terminal has an associated loudspeaker and is capable of emitting an audible indication that an incoming call has been received.

10 4. A system as claimed in claim 3, wherein the audible indication from the or each computer terminal is audibly differentiated from any other computer terminal.

15 5. A system as claimed in claim 4 wherein when an audible indication is given at a computer terminal not directly associated with the incoming call the audible indication is one which is individual to the intended recipient of the incoming call.

20 6. A system according to any preceding claim, including means for generating a screen pop at the screen of each terminal accessed in response to the receipt of an incoming call.

25 7. A system as claimed in claim 5 or claim 6 wherein each computer terminal can be independently programmed to provide audible indications for telephone numbers which are individual to that computer terminal.

comprising storing a plurality of numbers for giving access to a corresponding plurality of computer terminals arranged in a network, with each computer terminal being associated with a telephone having an individual number;

5 whereby each of said plurality of computer terminals is adapted, in response to the accessing of said list, by the recognition of an incoming call being one of said plurality of numbers to give an indication that an incoming call has been received to the computer terminals
10 not directly associated with the incoming call, the indication identifying the intended recipient of the incoming call.

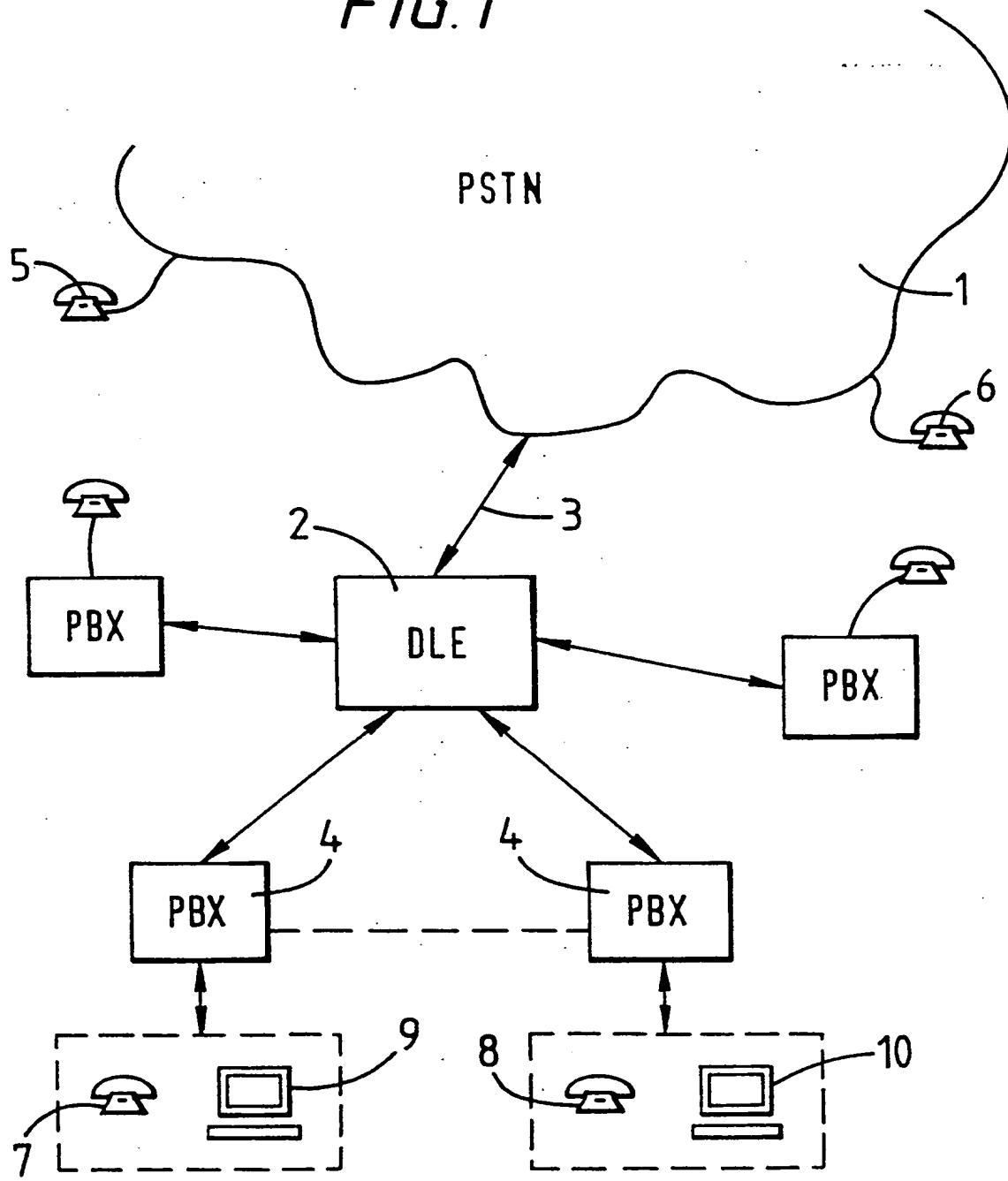
13. A method as claimed in either claim 11 or claim 12
15 wherein at least one computer terminal has an associated loudspeaker and is capable of emitting an audible indication that an incoming call has been received.

14. A method as claimed in claim 13, wherein the audible
20 indication from the or each computer terminal is audibly differentiated from any other computer terminal.

15. A method as claimed in claim 14 wherein when an audible indication is given at a computer terminal not
25 directly associated with the incoming call the audible indication is one which is individual to the intended recipient of the incoming call.

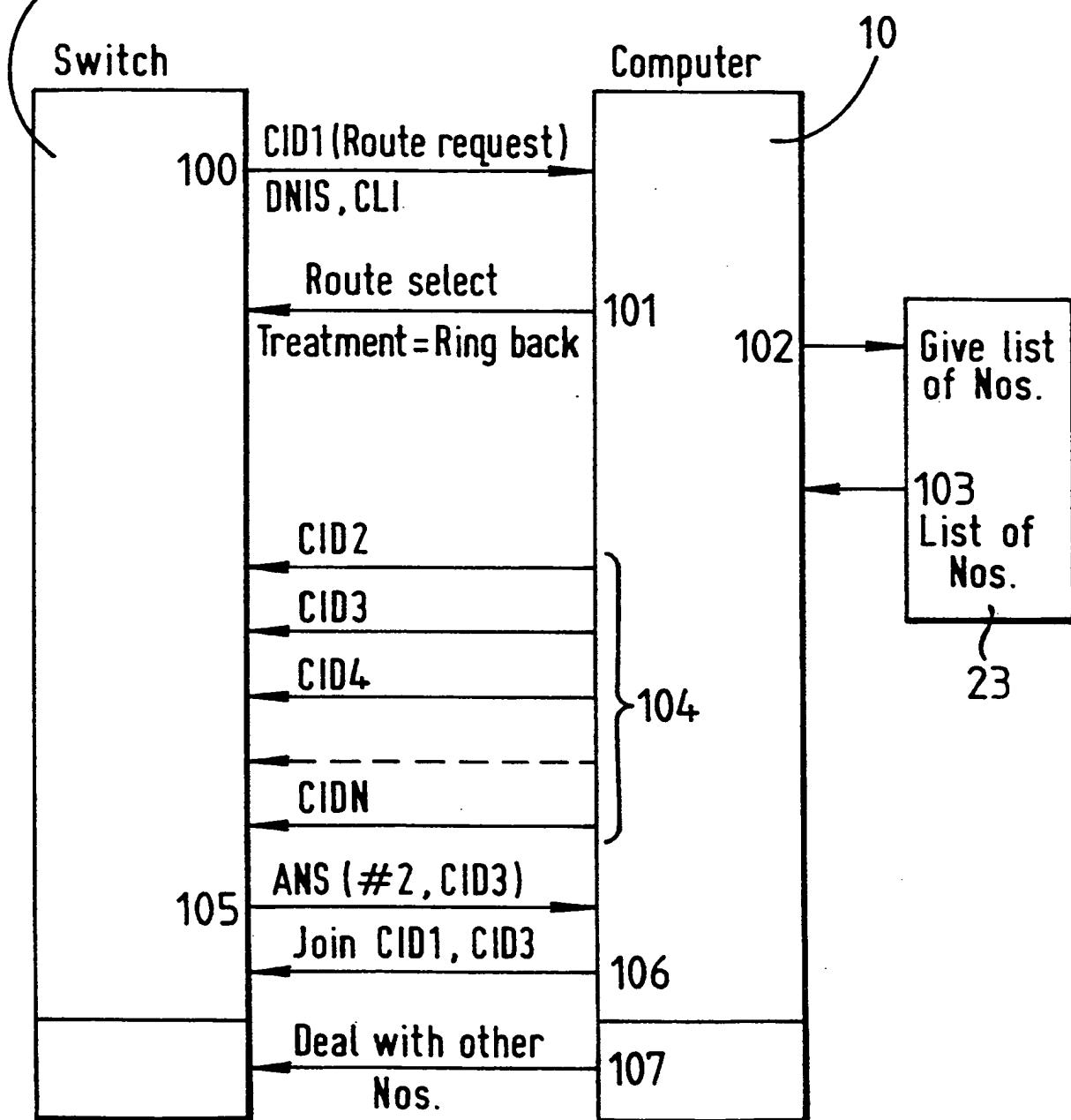
1/3

FIG. 1



3/3

FIG. 3



INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 98/01137

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JOHNSON P ET AL: "COMPUTER TELEPHONY INTEGRATION THE MERIDIAN 1 PBX" BRITISH TELECOMMUNICATIONS ENGINEERING, vol. 15, no. PART 02, 1 July 1996, pages 150-155, XP000598798 -----	1,6,8, 11,16,18